

2021 IEEE Intelligent Vehicles Symposium Workshops (IV Workshops 2021)

**Nagoya, Japan
11 – 17 July 2021**



**IEEE Catalog Number: CFP21IVW-POD
ISBN: 978-1-6654-7922-6**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP21IVW-POD
ISBN (Print-On-Demand):	978-1-6654-7922-6
ISBN (Online):	978-1-6654-7921-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

BLOCKCHAIN BASED VEHICLE AUTHENTICATION SCHEME FOR VEHICULAR AD-HOC NETWORKS	1
<i>Steffie Maria Stephen, Arunita Jaekel</i>	
ADS-B ATTACK CLASSIFICATION USING MACHINE LEARNING TECHNIQUES.....	7
<i>Thabet Kacem, Aydin Kaya, Ali Seydi Keceli, Cagatay Catal, Duminda Wijsekera, Paulo Costa</i>	
CYBERSECURITY THREATS IN CONNECTED AND AUTOMATED VEHICLES BASED FEDERATED LEARNING SYSTEMS.....	13
<i>Ranwa Al Mallah, Godwin Badu-Marfo, Bilal Farooq</i>	
INFLUENCES ON DRIVERS' UNDERSTANDINGS OF SYSTEMS BY PRESENTING IMAGE RECOGNITION RESULTS.....	19
<i>Bo Yang, Koichiro Inoue, Satoshi Kitazaki, Kimihiko Nakano</i>	
HUMAN-VEHICLE COOPERATION ON PREDICTION-LEVEL: ENHANCING AUTOMATED DRIVING WITH HUMAN FORESIGHT	25
<i>Chao Wang, Thomas H. Weisswange, Matti Krüger, Christiane B. Wiebel-Herboth</i>	
ONLINE AND ADAPTIVE PARKING AVAILABILITY MAPPING: AN UNCERTAINTY-AWARE ACTIVE SENSING APPROACH FOR CONNECTED VEHICLES.....	31
<i>Luca Varotto, Angelo Cenedese</i>	
HD MAP ERRORS DETECTION USING SMOOTHING AND MULTIPLE DRIVES	37
<i>Anthony Welte, Philippe Xu, Philippe Bonnifait, Clément Zinoune</i>	
USE OF PROBABILISTIC GRAPHICAL METHODS FOR ONLINE MAP VALIDATION	43
<i>Andrea Fabris, Luca Parolini, Sebastian Schneider, Angelo Cenedese</i>	
TOWARDS KNOWLEDGE-BASED ROAD MODELING FOR AUTOMATED VEHICLES: ANALYSIS AND CONCEPT FOR INCORPORATING PRIOR KNOWLEDGE	49
<i>Jenny Fricke, Christopher Plachetka, Bernd Rech</i>	
REAL-WORLD EVALUATION OF THE IMPACT OF AUTOMATED DRIVING SYSTEM TECHNOLOGY ON DRIVER GAZE BEHAVIOR, REACTION TIME AND TRUST	57
<i>Walter Morales-Alvarez, Mohamed Marouf, Hadj. Hamma Tadjine, Cristina Olaverri-Monreal</i>	
PRECISE SELF-LOCALIZATION FOR LAST MILE DELIVERY AUTOMATED DRIVING IN UNSTRUCTURED ENVIRONMENTS.....	65
<i>Paul Czerwionka, Fabian Pucks, Hans Harte, Roman Blaschek, Robert Treiber, Ahmed Hussein</i>	
DYNAMIC RECONFIGURATION OF AUTOMOTIVE ARCHITECTURES USING A NOVEL PLUG-AND-PLAY APPROACH.....	70
<i>Hannes Stoll, Daniel Grimm, Marc Schindewolf, Michel Brodatzki, Eric Sax</i>	
PRECISE CONTROL FOR DEEP DRIVING USING DUAL CRITIC BASED DRL APPROACHES	76
<i>Surbhi Gupta, Gaurav Singal, Deepak Garg</i>	

VALIDATION OF A RADAR SENSOR MODEL UNDER NON-IDEAL CONDITIONS FOR TESTING AUTOMATED DRIVING SYSTEMS.....	83
<i>Diogo Wachtel, Sabine Schröder, Fabio Reway, Werner Huber, Martin Vossiek</i>	
DETECTION OF COLLECTIVE ANOMALIES IN IMAGES FOR AUTOMATED DRIVING USING AN EARTH MOVER'S DEVIATION (EMDEV) MEASURE	90
<i>Jasmin Breitenstein, Andreas Bär, Daniel Lipinski, Tim Fingscheidt</i>	
TRAJECTORY PLANNER FOR PLATOON LANE CHANGE.....	98
<i>Haoran Wang, Jintao Lai, Jia Hu</i>	
RESEARCH ON OPTIMIZATION AND EVALUATION METHOD OF THE CAR FOLLOWING MODEL BASED ON SUMO APPLICATION TEST SCENARIO.....	102
<i>Qianjing Sun, Yong Wang, Lingqiu Zeng, Qingwen Han, Qinglong Xie, Lei Ye, Fukun Xie</i>	
AN ADAPTIVE COOPERATIVE ADAPTIVE CRUISE CONTROL AGAINST VARYING VEHICLE LOADS.....	108
<i>Yiming Zhang, Jia Hu, Haoran Wang, Zhizhou Wu</i>	
PREDICTING MOTORCYCLE RIDING BEHAVIOR USING VEHICLE DENSITY VARIATION.....	114
<i>Takamasa Koshizen, Fumiaki Sato, Ryoka Oishi, Kazuhiko Yamakawa</i>	
OBSERVER DESIGN WITH PERFORMANCE GUARANTEES FOR VEHICLE CONTROL PURPOSES VIA THE INTEGRATION OF LEARNING-BASED AND LPV APPROACHES	122
<i>Dániel Fényes, Tamás Hegedus, Balázs Németh, Péter Gáspár</i>	
NUMERICALLY STABLE DYNAMIC BICYCLE MODEL FOR DISCRETE-TIME CONTROL	128
<i>Qiang Ge, Qi Sun, Shengbo Eben Li, Sifa Zheng, Wei Wu, Xi Chen</i>	
REGULATING ROAD VEHICLE TELEOPERATION: BACK TO THE NEAR FUTURE.....	135
<i>Philip Almestrand Linné, Jeanette Andersson</i>	
ACTIVE SAFETY SYSTEM FOR SEMI-AUTONOMOUS TELEOPERATED VEHICLES	141
<i>Smit Saparia, Andreas Schimpe, Laura Ferranti</i>	
ADAPTIVE VIDEO CONFIGURATION AND BITRATE ALLOCATION FOR TELEOPERATED VEHICLES	148
<i>Andreas Schimpe, Simon Hoffmann, Frank Diermeyer</i>	
PEDESTRIAN TRAJECTORY PREDICTION VIA SPATIAL INTERACTION TRANSFORMER NETWORK.....	154
<i>Tong Su, Yu Meng, Yan Xu</i>	
LEARNING TO DRIVE FROM OBSERVATIONS WHILE STAYING SAFE.....	160
<i>Damian Boborzi, Florian Kleinicke, Jens Buchner, Lars Mikelsons</i>	
UNDERSTANDING AND PREDICTING OVERTAKING AND FOLD-DOWN LANE-CHANGING MANEUVERS ON EUROPEAN HIGHWAYS USING NATURALISTIC ROAD USER DATA.....	168
<i>Basma Khelfa, Antoine Tordeux</i>	
THE CONSCEND DATASET: CONCRETE SCENARIOS FROM THE HIGHD DATASET ACCORDING TO ALKS REGULATION UNECE R157 IN OPENX.....	174
<i>Alexander Tenbrock, Alexander König, Thomas Keutgens, Hendrik Weber</i>	

VALIDATION OF SIMULATION-BASED TESTING: BYPASSING DOMAIN SHIFT WITH LABEL-TO-IMAGE SYNTHESIS.....	182
<i>Julia Rosenzweig, Eduardo Brito, Hans-Ulrich Kobialka, Maram Akila, Nico M. Schmidt, Peter Schlicht, Jan David Schneider, Fabian Hüger, Matthias Rottmann, Sebastian Houben, Tim Wirtz</i>	
SPATIAL SAMPLING AND INTEGRITY IN LANE GRID MAPS	190
<i>Corentin Sanchez, Philippe Xu, Alexandre Armand, Philippe Bonnifait</i>	
PARAMETER-BASED TESTING AND DEBUGGING OF AUTONOMOUS DRIVING SYSTEMS	197
<i>Paolo Arcaini, Alessandro Calò, Fuyuki Ishikawa, Thomas Laurent, Xiao-Yi Zhang, Shaikat Ali, Florian Hauer, Anthony Ventresque</i>	
CONSTRAINED SAMPLING FROM A KERNEL DENSITY ESTIMATOR TO GENERATE SCENARIOS FOR THE ASSESSMENT OF AUTOMATED VEHICLES.....	203
<i>Erwin De Gelder, Eric Cator, Jan-Pieter Paardekooper, Olaf Op Den Camp, Bart De Schutter</i>	
FUNDAMENTAL DESIGN CRITERIA FOR LOGICAL SCENARIOS IN SIMULATION-BASED SAFETY VALIDATION OF AUTOMATED DRIVING USING SENSOR MODEL KNOWLEDGE	209
<i>Lukas Elster, Clemens Linnhoff, Philipp Rosenberger, Simon Schmidt, Rainer Stark, Hermann Winner</i>	
UNSUPERVISED JOINT MULTI-TASK LEARNING OF VISION GEOMETRY TASKS	215
<i>Prabhash Kumar Jha, Doychin Tsanev, Luka Lukic</i>	
THE OXFORD ROAD BOUNDARIES DATASET	222
<i>Tarlan Suleymanov, Matthew Gadd, Daniele De Martini, Paul Newman</i>	
PRUNING CNNs FOR LIDAR-BASED PERCEPTION IN RESOURCE CONSTRAINED ENVIRONMENTS.....	228
<i>Manoj Rohit Vemparala, Anmol Singh, Ahmed Mzid, Nael Fafous, Alexander Frickenstein, Florain Mirus, Hans-Joerg Voegel, Naveen Shankar Nagaraja, Walter Stechele</i>	
MACHINE LEARNING BASED 3D OBJECT DETECTION FOR NAVIGATION IN UNSTRUCTURED ENVIRONMENTS.....	236
<i>Gjorgji Nikolovski, Michael Reke, Ingo Elsen, Stefan Schiffer</i>	
CFTRACK: CENTER-BASED RADAR AND CAMERA FUSION FOR 3D MULTI-OBJECT TRACKING	243
<i>Ramin Nabati, Landon Harris, Hairong Qi</i>	
SELF-SUPERVISED REPRESENTATION LEARNING FOR CONTENT BASED IMAGE RETRIEVAL OF COMPLEX SCENES	249
<i>Hariprasath Govindarajan, Peter Lindskog, Dennis Lundström, Amanda Olmin, Jacob Roll, Fredrik Lindsten</i>	
QUANTITATIVE EVALUATION OF AUTONOMOUS DRIVING IN CARLA.....	257
<i>Shang Gao, Spencer Paulissen, Mark Coletti, Robert Patton</i>	
POMDP PLANNING AT ROUNDABOUTS.....	264
<i>Henrik Bey, Moritz Sackmann, Alexander Lange, Jörn Thielecke</i>	

PROBABILISTIC VRU TRAJECTORY FORECASTING FOR MODEL-PREDICTIVE PLANNING A CASE STUDY: OVERTAKING CYCLISTS	272
<i>Jan Schneegans, Jan Eilbrecht, Stefan Zernetsch, Maarten Bieshaar, Konrad Doll, Olaf Stursberg, Bernhard Sick</i>	
EKG-BASED SYSTEM USING DEEP LEARNING AND ATTENTION MECHANISM FOR DRIVER DROWSINESS DETECTION	280
<i>Miankuan Zhu, Haobo Li, Jiangfan Chen, Mitsuhiro Kamezaki, Zutao Zhang, Zexi Hua, Shigeki Sugano</i>	
DRIVING BEHAVIOR AWARE CAPTION GENERATION FOR EGOCENTRIC DRIVING VIDEOS USING IN-VEHICLE SENSORS	287
<i>Hongkuan Zhang, Koichi Takeda, Ryohei Sasano, Yusuke Adachi, Kento Ohtani</i>	
KALMAN FILTER BASED EXTENDED OBJECT TRACKING WITH A GAUSSIAN MIXTURE SPATIAL DISTRIBUTION MODEL.....	293
<i>Kolja Thormann, Shishan Yang, Marcus Baum</i>	
IMPROVING OBJECT DISTANCE ESTIMATION IN AUTOMATED DRIVING SYSTEMS USING CAMERA IMAGES, LIDAR POINT CLOUDS AND HIERARCHICAL CLUSTERING	299
<i>William C. Tamayo, Nacer E. Chelbi, Denis Gingras, Frédéric Faulconnier</i>	
IDENTIFICATION OF VEHICLE DYNAMICS PARAMETERS USING SIMULATION-BASED INFERENCE	306
<i>Ali Boyali, Simon Thompson, David Robert Wong</i>	
OPENPLANNER 2.0: THE PORTABLE OPEN SOURCE PLANNER FOR AUTONOMOUS DRIVING APPLICATIONS	313
<i>Hatem Darweesh, Eijiro Takeuchi, Kazuya Takeda</i>	
EAGLEYE: A LANE-LEVEL LOCALIZATION USING LOW-COST GNSS/IMU	319
<i>Aoki Takanose, Yuki Kitsukawa, Junichi Megruo, Eijiro Takeuchi, Alexander Carballo, Kazuya Takeda</i>	
CHARACTERIZATION OF MULTIPLE 3D LIDARS FOR LOCALIZATION AND MAPPING PERFORMANCE USING THE NDT ALGORITHM.....	327
<i>Alexander Carballo, Abraham Monrroy, David Wong, Patiphon Narksri, Jacob Lambert, Yuki Kitsukawa, Eijiro Takeuchi, Shinpei Kato, Kazuya Takeda</i>	
AUCTION BASED PARKING LOT ASSIGNMENT AND EMPTY CRUISING LIMITATION OF PRIVATELY OWNED AUTONOMOUS VEHICLES IN A SIMPLE CITY MODEL	335
<i>Levente Alekszejenkó, Tadeusz Dobrowiecki</i>	
TRAJECTORY PLANNING WITH COMFORT AND SAFETY IN DYNAMIC TRAFFIC SCENARIOS FOR AUTONOMOUS DRIVING	342
<i>Jiahui Zhang, Zhiqiang Jian, Jiawei Fu, Zhixiong Nan, Jingmin Xin, Nanning Zheng</i>	
A SURVEY ON DEEP DOMAIN ADAPTATION FOR LIDAR PERCEPTION.....	350
<i>Larissa T. Triess, Mariella Dreissig, Christoph B. Rist, J. Marius Zöllner</i>	
INVESTIGATING VALUE OF CURRICULUM REINFORCEMENT LEARNING IN AUTONOMOUS DRIVING UNDER DIVERSE ROAD AND WEATHER CONDITIONS	358
<i>Anil Ozturk, Mustafa Burak Gunel, Resul Dagdanov, Mira Ekim Vural, Ferhat Yurdakul, Melih Dal, Nazim Kemal Ure</i>	

COMBINING SEMANTIC SELF-SUPERVISION AND SELF-TRAINING FOR DOMAIN
ADAPTATION IN SEMANTIC SEGMENTATION 364
Joshua Niemeijer, Jörg P. Schäfer

PRACTICAL OBJECT DETECTION USING THERMAL INFRARED IMAGE SENSORS 372
Iljoo Baek, Wei Chen, Asish Chakrapani Gumparathi Venkat, Rangunathan Raj Rajkumar

Author Index